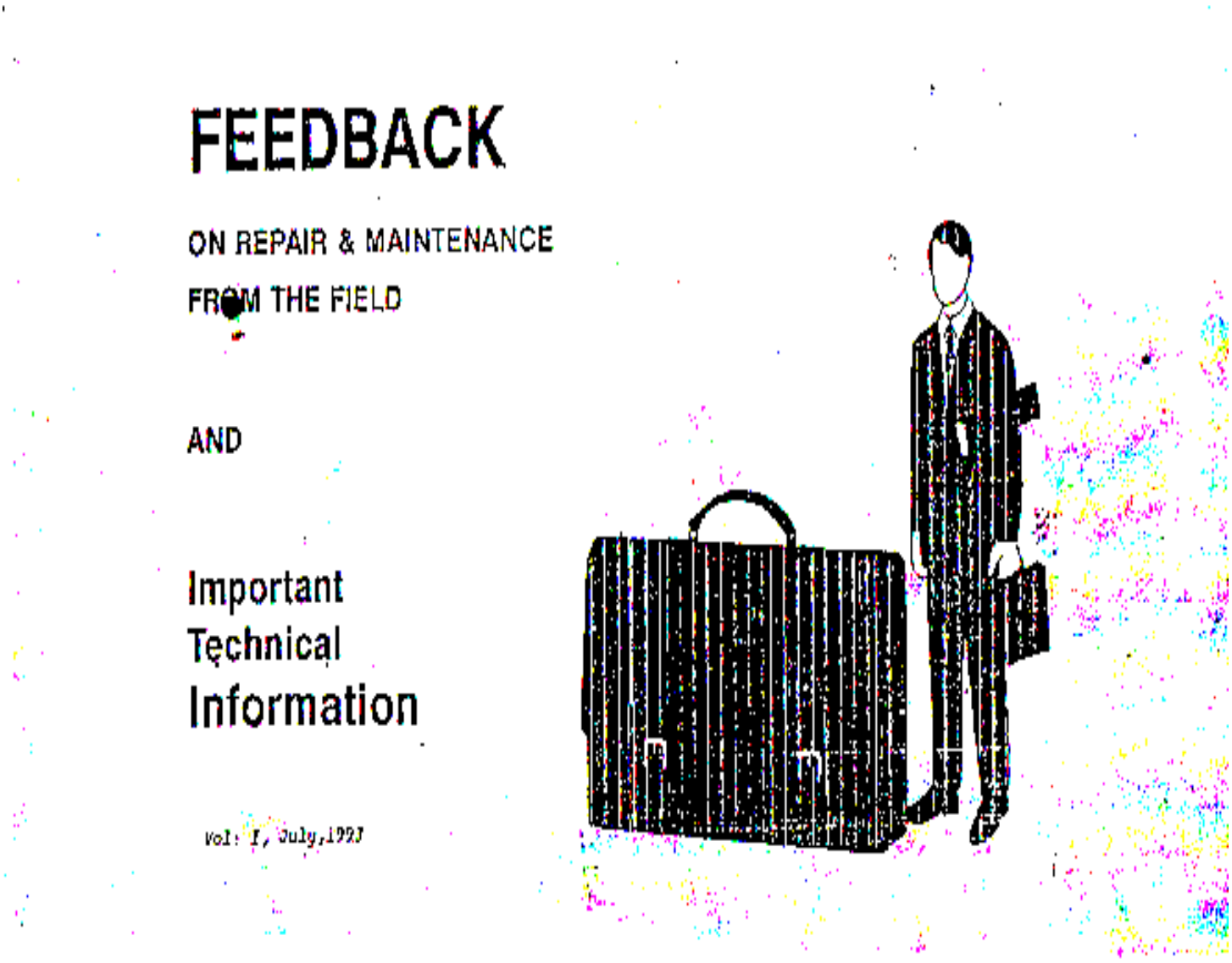
FEEDBACK ON REPAIR AND MAINTENANCE FROM THE FIELD AND Important Technical Information



Foreword……

The refreshers training courses on maintenance & repair of WIC electrical systems, repair of Generator engine & refrigeration system provided the technician participating in the courses to exchange views & experiences thus far. This booklet 'FEEDBACK…..' is a compilation of various experiences including valuable tips which will serve on the one hand as a technical update & on the other hand as tool for sharing & exchanging technical realities related to the repair & maintenance of cold chain equipments of UIP in India.

It is felt that the technicians in the field will be benefited from the information contained in this booklet & will receive guidance in attending to similar problems in the equipments & their repair.

To the readers of this booklet,' FEEDBACK….' would be available to share various interesting observations, repair actions, innovative ideas & also some suggestions(tested/verified/confirmed only)based on their last few years of maintenance experience. Please send them, in a similar format, to the address given below. The valuable experiences which can help others in maintaining cold-chain equipments efficiently & better will be included in the next issue of 'FEEDBACK…'

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COLD CHAIN MAINTENANCE- 'FEED-BACK'

COMPONENT	FAULT	LOCATION	OBSERVATION /FINDING	ACTIONS/ SUGGESTIONS/ REMARKS
'Foster' (WIC) Cooling unit	1.'Gas' leak	1.Balasore 2.Bhagalpur	1.WIC Temp.high 2.Suction pr.7.8 psi(Good unit – 20 psi) 3.Soap water testing indicated service valve on suction side leak from gland packing. 4.Bubbles with liquid in sight glass.	Screw on service valve tightened. No leak. Added required qty.of R12 till suction pr.was about 20 psi & no bubbles in sight-glass.
		3.Bhopal (WIF)	1.Leak in evaporator pipe. 2.No liquid in sight-glass. 3.Compressor stops on HP/LP	Charged with R12 for leak testing & leak detected on evaporator coil. Unit taken out & leak repaired by gas welding. Evacuated & charged with combination of R12 & R22 in equal quantity. Working OK.
		4.Ajmer	1.Compressor trips after 1- 2 min on HP/LP 2.Bubble in sight glass 3.Leak at flare-nut connection to HP/LP1.	Closed service valve on compressor, removed flare- nut from HP/Pomade flare proper, refitted applying Teflon tape. Replaced compr.mountings- modifying available grommet of Airconditioners.Charged R12 till full liquid in sight-glass-OK(This might be due to vibration of the compressor.
		5.Bhuj 6.Kota	1.WIC temp.high 2.Bubble with liquid in sight glass.	Leak detected at filter flare joint, tightened flare nut-OK.Added R12 till auction pr.was about 20 psi & no bubble in sight glass.

'Foster' (WIC) Cooling unit	**2.Compressor defective**	**1.Balasore**	**1.Noisy**	**Transit damage. taken out compressor opening flare joint on suction & discharge. Opened the compressor by cutting,found one of the three mounting spring broken.repaired,refitted & changed drier. Evacuated-heating during evacuation. Charged R12, OK.**
		2.Guntur	**1.Unit not running 2.High compressor amps(20 amps) 3.No hum/noise 4.Relay & capacitor tested in the good compressor-OK 5.Resistance: R-C=0 ohms S-R=2 ohms Terminal Body=Infinite**	**Compressor defective, to replace.**
		3.Bhopal (WIF)	**1.Compressor too hot. 2.Trips at high amps on overload(after about 2 min) 3.Compressor not running, no hum/noise 4.Tried with the relay,OLP & capacitor or working unit-does not run.**	**Compressor taken out & winding repaired. Replaced one defective valve plate. Refitted & charged with R12- Ok**
	3.Condenser fan-motor burnt	**1.Amritsar 2.Parabhani 3.Bhopal (WIF) 4. Gorakhpur 5.Bhuj 6.Kota 7.Jabalpur**	**1.Unit trips –off often on HP**	**Fan-motor rewound/replaced OK # Compressor may trip off on OLP also. # MOTORS CAN BE REWOUND LOCALLY(Rs.150/- Gorakhpur)**

'Foster' (WIC) Cooling unit	**4. Condenser fan-motor jammed.**	**1.Vadodara 2.Phulbani 3.Balasore 4.Parabhani 5.Gurgaon 6. Hyderabad 7.Nasik 8.Akola 9.Dibrugarh 10 Gandhi-nagar 11.Jabalpur 12.Tirunelve-lly**	**1.Bush /bearing jammed 2.Running slow & sometimes stops 3.Compressor may trip off on HP**	**Bushing removed,cleaned,oiled & refitted- OK Can be replaced from spares. # 3-in-1 oil can be used for cleaning & oiling. # BUSHING MAY BE AVAILABLE LOCALLY.SHAFT-IF WORN OUT,CAN BE REPAIRED THROUGH LOCAL WORKSHOP.**
		13.parabhani(x2) 14.Thane (x3)	**Temp of WIC slightly high, compr, trips frequently, Running & Starting capacitors became defective**	**Bushings replaced with bearings locally available-OK. See Suggestion #1**
		15.Ganjam	**Winding defect**	**Rectified – OK**
	5.Evaporator fan defect	**1.Purnea 2.Bhagalpur 3.Ganjam 4.Faizabad 5.Shimla**	**Motor jammed (then heats up & burned in some cases). More frost on evaporator**	**Serviced- # Bearings are cleaned with K. oil and by petrol. # Don't use Kerosene or Mobil.**
	6. C1-Contactor defect	**1.Gurgaon 2.Vadodara**	**Jammed/ mechanical problem.**	**Replaced / Refitted.**
		3.Gandhi-Nagar	**Compressor coming on/off erratically.**	**Remove cleaned and refitted - OK**
		4.Nasik	**Contactor coil burnt in both the units at the same**	**One replaced with available spare and other by equivalent**

			time(Voltage problem-NK Low voltage protector also burnt)	Simens contactor model 3TB4117-OA available locally.
		5.Bikaner	Coil bobbin partially deformed due to overheat & not allowing contacts to make.	Replaced.
		6.Merrut	Compressor not working.	
		7.Bhopal (WIF)	Burning smell from contactor.	
		8.Almorah 9.Bhuj 10.Ajmer 11.Faizabad 12.Bhagalpur 13.Tirunelvelly 14.Jabalpur	Contactor coil burnt.	Replaced Coil. # Can be replaced by any other equivalent 230V contactor COIL.
	7.Defrost- timer defect	1.Vadodara 2.Lucknow 3.Gunjam	Not working/contacts remained open/Stops intermittently	Replaced
	8.Starting capacitor defect	1.Merrut 2.Almorah 3.Dibrugarh	Compressor does not start. CBI trips off, capacitor found short/burnt.	Replaced
		4.Jabalpur	Both start & run capacitor of one unit burst at the same time.	# This may be due to excessive high voltage/spikes, Replaced-OK
	9.Compressor starting trouble	1.Purnea	High starting current vibration of compr.& heats up.Trips on OLP.	Capacitor tested, apparently OK. # Check starting relay & capacitor.
	10.Thermostat defect	1.Bikaner	WIC temp.falling down to 1^0C.	# Main scale adjustment screw turned 1/2 turn to increase setting
		2.Ajmer	WIC temp. falling down to 1^0C	Stopped the unit. Carbon observed on thermostat contact points. Cleaned-OK.

	11.HP/LP pressostat defect	**1.Vadodara**	**Did not trip on low pressure when drier was choked & pr.was 7 psi(i.e.0.5 BAR).While pumping down also it did not cut off.**	**# As main setting is 25 psi & also diff.setting is 25 psi,it should only cut-off just above 0 psi.During pumping down, it should have cut-off may be defective.Check the settings.**
	12.Filter drier choked	**1.Vadodara**	**1.Both units were running 2.Drier cold 3.Suction line warm 4.Discharge line less warm. 5.Current less, about 4A. (normally=7-8 A)**	**Opened flare nut at expansion valve, very little gas coming out,doubt that filter is choked. Connected manifold gauge on suction service,valve,pr=7 psi(normal=20 – 25 psi).Closed suction line valve ,kept compr.running & closed receiver valve on pumping down. Changed filter-drier,purged,opened suction & receiver valves –OK.**
'Foster'(WIC) cooling unit	**1.No defrosting**	**1. Chandigarh**	**Heavy ice formation on evaporator. Defrost timer, contactor & heaters-OK.Heat-limit defective.**	**First defrosted the unit by shorting the heat limit terminals on the terminals strip in unit control panel.Changed heat –limit-OK.**
'Foster' Cold-room Panel	**1.New type panel not received/ fitted.**	**1.Amritsar 2.Hosiarpur 3.Parbhani 4.Gurgaon 5.Firozepur 6. Kurukhetra 7.Thirunelvelli 8.Kurnool 9.Almorah 10.Bikaner 11. Gorakhpur**	**Only one unit works from mains power. (In most of the places the new panel is not filled as the mains power cannot run both units together due to poor line/voltage condition, will be fitted only on improvement of the power supply condition)**	**# One New-panel,one cable,one aux.contact for NK,T1 for 3-start order(yellow,with 2 pots). Dispatched to all WIC/F in end 1986. #Locate & connect them in place of old-panel as given in *See suggestion #3 *Also see suggestion# 2**

	2.MCB tripping	**1.Gurgaon** **2.Kota**	**MCB trips off after about one hour & becomes hot(old-panel)** **MCB trips at intervals even when running current is OK.**	**Replaced- OK** **# If the system takes heavy current,the MCB will trip immediately. In case MCB is faulty, it will trip after sometime of putting the load ON. Confirm fault by measuring the load current. For replacement,use MCB with similar rating(motor-load type)** **Replaced-OK**
	3.Low voltage protector,C2 relay defect	**1.Nasik** **2.Balasore** **3.Thane** **4.Calicut** **5.Guntoor** **6. Chattarpur** **7.Gandhi nagar**	**1.Relay not functioning/** **2.Base & Relay pin burnt(Base & Relay cannot carry heavy current)**	**Replaced- OK** **# This relay contacts can be replaced by a contactor when connected properly in the circuit.** **# For cleaning relay contacts use finest emery paper/needle file** **# Contact burning is caused by fluctuating low voltage.**
	4.Only one unit works	**1.Thirunelvelly**	**Only the selected unit(1 or 2)works even on mains power.**	**#Check-NK aux.contact(33-34)in generator panel.** **-the cable connection to the above contacts points** **-the cable connection (other end)at 11 & 12 of "new" cold room panel.** **# If NK(33-34)is defective,use the free NC contact pair of NK.**
	5.B3 Selector switch defect	**1.Thane** **2.Gandhinagar**	**Units not getting supply**	**Replaced- OK** **B3 points shorted. To replace**

				# Try to find locally available two-way switch with off position.
	6. Contactor defect	**1.Bhopal (WIF)**	**One unit not working Contactor burnt.**	**Shorted contacts temporarily.** **# WHEN SHOTTED LIKE ABOVE,KEEP THE SELECTOR IN THE POSITION SELECTING THE UNIT FOR WHICH THE CONTACTOR IS SHORTED.**
	7.Alarm Circuit	**1. Gorakhpur**	**Alarm 'on' when WIC temp.OK.No effect of pressing reset.**	**Check T1 & its circuit & wirings.**
'Foster' generator panel	**1.Mains power not going to the units.**	**1.Gurgaon 2. Berhampur 3.Kurnool 4.Guntur 5. Chattarpur 6.Jabalpur 7.Bhopal (WIF) 8.Bikaner 9.Jodhpur 10.Ajmer 11.Kurukhetra 12.Merrut 13.Gorakhpur 14.Purnea 15.Ganjam 16.Phulbani 17.Sambalpur 18.Balasore 19.Faizabad 20.Vadodara**	**1.NK contact not making/ 2.S6 fuse blown off/ 3.NK contactor coil burnt.**	**# Replace defective coil/contactor/fuse # Coil can be rewound locally. # Removed the contacts which were not making, cleaned carbon from contact points & refitted- OK # Services of locally available Tc-contactors are found better, lasts longer. # THIS IS MAINLY DUE TO LOW/FLUCTUATING VOLTAGE PROBLEM. # see suggestions #4**
	2.Generator power not extended to units	**1.Hyderabad 2.Gorakhpur 3.Bhopal (WIF) 4.Ganjam**	**T3 defective Power not available at cold-room panel GK & T3 not working.**	**Replaced OK # Check T1,T3 7 GK circuits as per diagram #3**

'Foster' Generator Panel				**T3 potentiometer turned both ways slightly & reset,it worked so also GK- OK**
	3.Generator not starting	**1.Parbhani**	**Auto/manual switch contacts not making**	**Replaced switch-OK**
		2.Nasik	**Auto/manual switch faulty,GK(51-52)burnt.**	**# To replace**
		3.Vadodara	**Works on Auto,does not work on manual**	**Auto/manual switch A1-5 & 6 not making. To repair/replace.**
		4.Akola **5.Vadodara**	**Starter bendix & flywheel ring gear teeth damaged.**	**# To replace**
		6.Phulbani	**Starter solenoid connection terminal lug sulphated**	**Replaced –OK**
		7.Kurnool	**Starter motor winding burnt,flywheel teeth work out.**	**Motor rewound-OK,flywheel needs early replacement.**
		8.Guntur	**R1 relay defective, not operating.**	**Replaced- OK**
		9. Nasik(on other occasion)	**R1 not operating,'-ve' line not getting completed, wire came out of 'C' terminal of charging relay.**	**Wire connected-OK** **# Wires of start 7 stop solenoid circuits should be more than 20 gauge size.Diode replaced with BY127,locally available.** **# Note: R1 & R2 are identical.**
		10.Agra **11.Jabalpur**	**Fuse,S1 blow off Protection diode defective**	**# Check the 3 protection diodes** ***See suggestion #8**
		12.G'nagar **13.Ajmer**	**Smoke from charging relay on engine**	**# Replace charging relay. Check battery condition & replace if not good.**

'Foster' Generator Panel	**4.Generator panel Wiring/ component burnt**	**1.Amritsar 2.Vadodara 3.Akola 4.Ernakulam 5.Kurukhetra 6.Thane 7.Bikaner**	**Panel wiring & stop solenoid burnt**	**Panels required- OK.If only a few wires/components burn,the panel can be repaired easily.**
		8.Berhampur	**Stop solenoid & RH1 & RH2 burnt.**	**Burnt wires & relays replaced-OK Rewound, worked for 3 months & burnt again. Replaced-OK See suggestion #5 #9**
	5.Generator not stopping	**1.Amritsar**	**Stop solenoid not drawing the plunger in**	**Solenoid fixing nut-bolts loose due to vibration resulting in defect in alignment Defect rectified –OK.**
		2.Gorakhpur	**Fuse,S1 blows off after genr. started. Hence to be stopped manually.**	**# Check fuse rating & also if 'slow-blow' type. Check the 3 protection diodes in the back of the panel.Also check RH2 & wirings.**
		3.Bhopal	**RH2 chatters. Solenoid tested-OK but not operating.**	**# Check RH2 & wiring to solenoid.**
		4.Nasik	**RH2 operates solenoid- OK but does not operate.**	**Wire from panel to stop-solenoid was of thin aluminium.Changed to 4 mm^2 copper cable- OK.**
		5.Ajmer	**Stops on 'Manual' but not in 'Auto'.+ve wire to Terminal #1 becomes hot,+ve available upto L18 only but not at stop-solenoid.**	**# Check connection & connecting wires from L18 to other multiple points.**

'Foster' Generator Panel		**6.Nasik**	**Stop solenoid coil burnt**	**Replaced- OK**
	6.Automatic charging rectifier,E1	**1.Gurgaon** **2.Vadodara** **3.Bikaner** **4.Bhopal** **5.Ajmer** **6.Gurgaon** **7.Dibrugarh** **8.Jabalpur** **9.Ajmer** **10 Gandhi-nagar**	**Resistors from E1 circuit came out.** **S2 fuse blown off** **Two resistor burnt.** **No charging, dry solder on resistor terminal**	**Resoldered- OK** **# While resoldering,tie the resistor to the eyelets with extra wire.** **Battery charge very low. Recharged externally & reconnected- OK** **Fitting local ones did not help. Some more problem may be there. Need to change E1** **Rectified soldering –OK** ***See suggestion #10**
	7.N1 defect	**1.Bhopal(WIF)**	**Units not working,N1 & NK not working.N1 contacts defect**	**Replaced N1**
	8.Terminal strip	**1.Madras**	**Mains fuse blowing off.Terminals R & O shorted by sparking/ melting.**	**Replaced terminals- OK.**
'Foster Generator Engine' (DM-188)	**1.Excessive vibration**	**1.Bikaner** **2.Gandhinagar**	**Foundation/ grouting loose** **Wires come out of terminals**	**Corrected OK** **# Check grouting & mounting,coupling & alignment of engine & alternator shafts**
	2.Charging relay defect	**1.Ajmer**	**Burnt out**	**Replaced –OK**
	3.Not Starting	**1.Madras** **2.Coimbatore**	**Self-starter winding burnt** **Fuel-pump assy.& seat found broken**	**Replaced-OK** **Need replacement(Float Genset connected)**
'Foster' Tempera-ture Recorder	**Temperature recorder not working**	**1.Vadodara** **2.Sambalpur** **3.Berhampur** **4.Gorakhpur**	**Sensor bulb damaged in transit /major defect** **Not working** **Recorder arm not sitting properly.**	**Replaced** **No details.To examine before replacement.** **# Repair/Adjust**

		5.Ajmer **6.Gandhinagar** **7.Akola**	**Dirt & lubricant formed paste,gears jammed.** **Chart speed slow covers 2 hours division in 3 hours.**	**Cleaned & oiled Ok** **# Check your mechanism,may be defective/dirty.**
'Huurre' Cooling Unit	**1.F1 MCB trips when unit switched ON**	**1.Chandigarh (Punjab)** **2.Rajkot** **3.Bhubaneswar** **4.Trivendrum** **5.Madurai** **6.Muradabad** **7.Surat** **8.Gwalior** **9.Visakha-pattanam**	**Circuit breaker trips off.Varistor R7 defective, shorted.**	**Replaced –OK.**
	2.Frost on evaporator not completely melted during defrosting	**1.Bhubaneswar** **2.Muradabad** **3.Bhopal**	**Timer-OK,but time set is 15 minute.**	**Increased time-setting to 30 min- OK.**
	3.Thermostat defect	**1.Chandigarh** **2.Aurangabad** **3.Rajkot**	**Not-cutting OFF**	**Replaced-OK.**
	4.Condenser fan-motor burnt/defect	**1.Lucknow** **2.Patna** **3.Madurai** **4.Kolhapur**	**Motor winding burnt.** **Unit trips off on HP,winding burnt.** **Jammed, unit trips on HP**	**Replaced-OK.** **Replaced-OK.** **Cleaned & lubricated – OK.**
	5.K1 contactor defect	**1.Bareilly** **2.Lucknow** **3.Pune** **4.Chandigarh** **5.Bhubaneswar** **6.Trivandurum** **7.Ratlam** **8.Betul** **9.Gwalior** **10.Kolhapur** **11.Surat** **12.Visakhapattanan**	**Contactor coil burnt.**	**Replaced-Ok** **# K1 contactor can be replaced by any 3 phase 16 Amps contactor having 220 volts coil. Locally available 'Tc'**

'Huurre' Cooling Unit		**13.Moradabad**	**Mechanical jam**	**contactor similar to NK of 'Foster' is suitable.**
	6.Condenser fan-capacitor defect	**1.Bhubaneswar 2.pune**	**Capacitor Burnt**	**Replaced-OK.**
	7.Evaporator fan motor	**1.Betul 2.Patna 3.Tiruchirapalli 4.Visakhapattanam**	**Winding burnt Bearing jammed Bearing jammed**	**Replaced-OK. Replaced bearing from another burnt motor & overhauled- OK. Replaced with 'Crompton' 12" exhaust fan-OK.**
	8.Condenser fan motor	**1.Tiruchirapalli 2.Madurai 3.Kolhapur 4.Visakhapa-ttanam**	**Jammed Burnt,Compr tripping on HP. Work for about 10 min.,gets overheated & stops**	**Bush replaced & overhauled- OK. Replaced OK. Replaced OK. # This may be due to defect in winding insulation.**
	9.Switch SI defect	**1.Kolhapur**	**No making contact.**	**Shifted connections from defective contact to free contact available # There is one pair of free contacts in SI #Any other 10 Amps ON-OFF switch can be used.**
	10.Gas Leak	**1.Madurai**	**No cooling. condenser fan not working. Bubbles in sight-glass.Pressostat for condenser-fan not working. Leak detected on the capillary tube connected to the pressostat for condr-fan.The coiled portion cracked minutely due to rubbing on vibration.**	**Changed the defective capillary tube. Leak Test carried out.Evacuated & charged refrigerant(about $1^{1/2}$ kg.of R12) -Not working-OK.**

'Huurre' Cooling Unit		**2.Rajkot**	**Leak from non-return valve on charging tube**	**Valve not sitting properly-rectified-OK. See suggestions #6 & #7**
	11.HP/LP pressostat defect	**1.Udaypur**	**Compressor stops after running about some time. Thermostat, Gas-OK.**	**Tested unit by shorting Pressostat terminals temporarily-OK.HP/LP cuts off on LP.Increased setting adjustment by 1/2 turn-OK.**
	12.compressor defect	**1.Patna**	**Compressor winding defect.**	**Replaced-OK.**
	13.Vibration element for discharge line	**1.Tanzania** **2.Kunoor**	**Brust,due to compressor vibration.** **Leak**	**Replaced-OK.Compressor vibration reduced by changing grommet & rectifying mountings.** **Changed with locally available copper pipe of higher size.**
	14.HP switch for condenser fan motor	**1.Kolhapur**	**Not operating /contacts open**	**One component of contact operating mechanism dislocated.Repaired-OK.**
'Huurre'Temperature Recorder (old type)	**Temperature recorder not working**	**1.Chandigarh** **2.Trivandrum** **3.Bhubaneswar** **4.Rajkot** **5.Madurai** **6.Gwalior** **7.Rajot** **8.Bhubaneswar** **9.Jaipur**	**Transformer FBI winding burnt.** **Relay contact defective** **3.4 V Battery low** **Defect in circuit** **# To check electronic circuit/replace** **Chart cut-off by holder**	**Re-wound locally & refitted-OK.** **Repaired-OK** **#Replace battery.Also check for defect in the external d.c.circuit(KAP-4,FBI etc).** **# To be replaced.** **# Check chart rotation if restricted anywhere.**
'Huurre' Alarm unit	**1.Alarm sounder,A1 defect**	**1.Visakhapa-ttanam**	**A1 does not sound.**	**# Need repair/replacement.** **# Any 12 V DC electronic sounder can be connected in its place.**

'Huurre' Control panel(for petrol engine)	**1.Mains power not extended to the units**	**1.Pune**	**K11 faulty,K1 coil & contacts burnt, voltage between N & E observed more than 30 volts**	**K11 & K1 replaced.Power line checked & N-E voltage corrected.**
		2.Trivandrum	**K1 contacts fused together,coil burnt.**	**K1 replaced.**
		3.Bhubaneswar	**K1 coil burnt**	**Replaced.**
		4.Surat **5.Gwalior** **6.Aurangabad** **7.Madurai** **8.Kolhapur** **9.Gwalior** **10. Visakhapa-ttanam**	**K11 defective**	**Replaced.**
		11.Udaypur **12.Ratlam**	**K11 not working.Phase sequence changed by SEB.**	**Sequence corrected in the main-switch-OK.** **# K11 & K12 are identical & can be interchanged.**
	2.Generator not starting	**1.Trivandrum**	**DC fuse on generator terminal box blown off.**	**Replaced.**
		2.Rajkot	**KAP-3 defect**	**Replaced.**
		3.Pune **4.Lucknow** **5.Gwalior** **6.Kolhapur**	**No manual/auto start.No 12 V+ at pin-3 of KAP-3 when start order is given.**	**Replaced.**
		7.Bhubaneswar	**K13 coil burnt.**	**Replaced.** **#In this case the generator will start & run on 'auto' even if mains power is available.**

'Huurre' Control panel(for petrol engine	**3.generator starts & stops on 'manual'but not on 'auto'**	**1.Lucknow**	**Recent problem, not yet analysed.**	**# Suggestion for testing: 1.Check Aut/Man Switch contacts 1-2 2.Check connections to terminal 3 & 6 of KAP-3 from Aut/Man switch.**
	4.generator not stopping on manual but stops on Auto	**1.Rajkot 2.Gwalior 3.Raipur**	**This problem was experienced sometime back, but later disappeared(in all the 3 cases)**	**# Probable reason: 1.loose connection at terminals/connecting points in stop-circuit; 2.Selector contacts not making properly, at times; 3.Stop switch contacts dirty.**
	5.FBI(220-3.4V)transformer defect	**1.Pune 2.Bhopal 3.Bhubaneswar**	**Winding damaged/burnt**	**Replaced-OK.**
	6.Phase-sequence relay defect	**1.Madurai**	**No generator power to units.K21 not working.**	**Replaced-OK.**
	7.Generator power not extended to units	**1.Surat 2.Visakhap-attanam**	**K2 coil burnt.**	**Replaced-OK.**
'Foster' V.M.Diesel engine	**1.Diesel found mixed with Mobil oil**	**1.Amritsar**	**1.Oil pressure increased to about 70 psi 2.Abnormal rubbing sound. 3.About 2.5 lt.of liquid(oil + diesel)in sump.**	**Nozzle defect Possibility-orifice enlarged too much to allow diesel to drop down Replaced nozzle,engine running OK.**
	2.Not stopping even after solenoid plunger is fully pulled in	**1.Amritsar**	**Stop-lever is not pulled fully by solenoid as the coupling nut-bolts were loose(slips on thread).**	**New nut- bolt fitted-OK.**
	3.Oil Seal leak	**1.Nasik**	**Profuse leakage of mobil oil on coupling side**	**Fitted new oil-seal –OK # Replacement locally available # Check crank-case ventilation**
	4.Engine noise, knocking	**1.Thane**	**Excessive vibration, nozzle defect**	**Cleaned nozzle,pressure adjusted- OK # Assistance from MICO Pressure setting 200 – 210 kg per cm.sq.**

'Foster' V.M.Diesel engine	**5.Oil pressure decreases after about 2 hours running**	**1.Phulbani 2.Vadodara**	**Improved after change of oil. Oil changed again after 15 days & more improvement observed.**	**No record of earlier oil change. #Oil must be changed strictly as per schedule.**
	6.Engine starts but can not attain full speed.	**1.Bhubanswar**	**Carbon on nozzle orifice**	**Cleaned orifice with thin steel wire & finest emery paper-OK.**
	7.Excessive vibration	**1.Nasik**	**Chassis cracked & fuel tank strap broken due to vibration.Generat or grouting OK but no mounting fitted.**	**#Examine grouting & Engine-Alternator alignment.They should be properly aligned & firmly mounted on chassis.**
'Huurre' (New)Control Panel for Diesel Engine	**1.Generator not stopping**	**1.Ratlam**	**Doubt on stop-solenoid & km2 relay.**	**To be checked & replace if required.**
	2.Stop solenoid defect	**1.Moradabad**	**Solenoid not pulling fully due to pull-wire out of position.**	**Put in proper position & tightened connector-OK.**
	3.K2 contactor defect	**1. Moradabad 2.Betul 3.Tiruchirapalli**	**K2 coil winding burnt.**	**Replaced K2-OK.**
	4.Generator not starting	**1.Ratlam**	**Km1,km2 operate but contacts not making properly due to carbon formation on the points.**	**Opened relay & cleaned contact points-OK.**
		2.Tiruchirapalli	**K31 relay got stuck.**	**Rectified the spring-OK.**
	5.Trickle charger defect	**1.Ratlam**	**Transformer burnt, transistor(TAG8618)defective.**	**Parts not available.Fabricated a charger locally providing a switch on the AC input side & connected working OK.**

'Huurre' petrol Engine (Honda G-400)	**1.Starting trouble**	**1.Trivandrum**	**Scaling observed in the carburetor(breaks to powder),float stuck**	**Cleaned carburetor completely, working OK**
		2.Japiur & several other places	**Sludge in fuel tank & carburetor**	**Drained fuel tank & cleaned carburetor & fuel tank.Filled fresh fuel-OK. Probable reason: 1.Contaminated fuel, 2.Long storage without use. See suggestions #12**
	2.leakage from carburetor(o-ring)	**1.Rajkot**	**o-ring defective**	**Replaced from local market.**
	3.Choke not working automatically has to be operated manually	**1.Rajkot**	**(No more detail)**	**# Check choke-solenoid/choke-solenoid arrangement to choke-lever.**
	4.Leakage from carburetor	**1.Lucknow 2.Madurai**	**Slight leakage from carburetor.**	**Cleaned the carburetor. Minute leak still persists. # Check needle valve**
		3.Dispur(B & S)	**Float valve defective**	**Replaced by float valve of 'Bajaj' scooter(length had to be cut to bring to proper size.)**
	5.Engine not taking load	**1.Kolhapur**	**Doubt in combustion chamber.Alternator,CB point & valve etc.of engine checked-OK**	**Taken out the spark-plug & measured compression=75 psi.Some oil poured through the port of the plug & measured compression=80 psi.Generator is working OK now.**
		2.Pune	**Plug defective governor need adjustment.**	**Changed plug & adjusted governor-OK.**
	6.Engine misfiring	**1.Madurai**	**Engine misfires**	**Adjusted carburetor-OK.**

'Huurre' petrol Engine (Honda G-400)	**7.Speed low on load**	**1.Visakhap-attanam**	**No load speed-OK. Speed low when loaded.**	**# Check engine & governor.**
'Huurre' Diesel Engine (New)	**1.Starting problem**	**1.Tiruchirapalli** **---do—** **2.Surat**	**Air filter blocked.** **Battery charge low.** **Engine can be started only after giving +ve supply to the solenoid valve in fuel line**	**Cleaned with diesel/petrol & refitted – OK.** **Added distilled water & recharged-OK** **# It appears that the solenoid valve is of 'NC' type.** **# Try changing connection of relay K26:Shifted to 4 & 7 to 5.If not successful put connections to original . Give feed-back.**
	2.Engine not stopping	**1. Tiruchirapalli**	**Not stopping in either manual or Auto mode. Stop solenoid coil burnt.**	**To replace.**
	3.Charging relay defect	**1.Tiruchirapalli**	**No +ve output on running of generator.**	**Replaced-OK.**
ALTERNATORS	**1.No output**	**1.Pune(HUU) Mecc alte**	**Rectifier Bridge in regulator(18)-diode shorted**	**Replaced by making a bridge with BY 127 diode (Locally available)**
	2.Only 2 phases available	**1.Surat(HUU) Mecc Alte**	**No output in one phase. Field excitation voltage in all the 3 phases are OK.**	**#Isolate generator from panel & check circuit voltage(No-load)& find out the missing phase; #Check 'B' coil & its connection.**
	3.Output Voltage low	**1.Surat(HUU)**	**After repair of the missing phase as advised above,output voltage found to be low**	**#First,check the engine speed & then the regulating transformer connections.**
	4.Carbon Brush worn out	**1.Bikaner(Fos)**	**Brushes worn out to half due to dislocation of Brush-arm**	**Rectified brush-arm-OK.**
Power Supply (MAINS)	**1.Voltage low/ fluctuations.**	**1.Nasik**	**Severe fluctuations. Voltage stabilizer needed.**	

Power Supply (MAINS		**2.Ernakulum** **3.Kozikode** **4.Gurgaon** **Maharashtra ,A.P.& U.P.**	**Fluctuations (150-250 V) during 6-10 pm.** **Fluctuations (140-200 V)** **In Some places voltage as low as 160 V**	**Locally purchased 5 KVA servo stabilizer(120-280 V)fitted.'keltron'make, with auto-cut.** **Voltage stabilizer (Voltas,relay type,5 KVA,no auto-cut)fitted.** **NK burned due to low voltage** **# Need good servo stabilizers 150-280 V input & 220 V out-put.**
	2.Voltage drop in service connection	**Several installations**	**-Aluminum conductors used** **-Lower size of wire used.**	**# Replace wiring with Copper wires or proper size & make the joints proper wih clamps.**
	3.High Line resistance	**1.Jabalpur**	**2 units cannot run together from power most of the time.CB of one started later trips.**	**Power circuit needs check up/repair.**
	4.Load shedding	**Andhra Pradesh**	**3-4 hours power cut(Scheduled & notified).**	**# Run generator when the WIC temp.is +8^{0}C & stop when reaches+4^{0}C.**
'Vestfrost'MK-140/142 ILRs	**1.Sub-zero temperature at minimum setting of thermostat.**		**# Probable defect.** **-Tail of the thermostat not in proper position.** **-Thermostat need adjustment.** **-Thermostat defective.**	**# Rectify. If even after rectification or replacement problem persists.** **#Try adjustment of the bellow screw.1turn anti-clockwise will increase temp.to about +2^{0}C. (Orissa & Kerla experience)**
	2.Thermostat tail does not come out for replacement		**Tail hard to pull out. Rust in the tube housing the tail.**	**# Allow machine to defrost completely & then only try to pull out the tail.**

'Vestfrost'MK-140/142 ILRs	**3.Filter /capillary blocked in some new units**	**Orissa Bihar Rajastan**	**This is mainly due to storing/ transporting the unit 'Upside Down'.**	**# Need to advise MSD,State HQ & Dist.HQ stores to take appropriate care while loading & transporting.**
	4.Compressor TFS 4 AT	**Assam= 1 No Orissa= 1 No**	**Replaced with PW 3.5 compressors.**	**Running satisfactorily in Assam for 3 months & in Orissa for more than year(as of May 92) # Please observe performance & send feed-back.**
'Vestfrost' SB-140/142 Freezers	**1.Compressor defect**	**1.Rajastan**	**Winding resistance-OK,but compressor jammed in about 3-4.**	**Replaced #These compressors can be repaired.**
'Electrolux'TCW-1151 ILRs	**1.Sub-zero temperature while running as ILR**		**This problem occurred when equipment was changed from freezer mode to OLR mode.**	**#Electrolux,TCW-1151 machines should be used only in one mode,i.e.either as ILR or as FREEZER only.No changeover is recommended.**
	2.ILR/Freezer selector switch	**1.Nasik(Naitale PHC)**	**Works as freezer but not as ILR.Selector switch defect.**	**Replaced selector-OK.**
ILRs & FREEZERs	**1.Leak in external parts**	**1.Shajapur(3) 2.Bhopal(3) 3.Ropar(1) 4.Bikaner(1) 5.Kheda(1)**	**Leak on charging tube(Process tube)near pinch off or brazing of the end. Leak on compressor body near terminal(on welding)oil found leaked out & compressor burnt**	**Repaired leak-OK. Compressor replaced.**
	2.compressor Jammed	**West Bangal Rajastan Assam**	**Compressor observed to be jammed,at site.**	**After transportation to repair centre,the jam found absent.This may be due to vibration/shock during transportation, the jammed rotor became free.**

ILRs & FREEZERs				**# Try inserting a capacitor(40-60 µF,220V)between No.11 & 13 of starting device. Knock the compressor body during starting process with a handle of a hammer,at different places. These actions may free the jam.**
	3.Internal leak in condenser evaporator		**-Temp goes down 2-3 days. -Formation of more frost on inner liner joint. -Abnormal liquid flow sound. -Trace of oil inside -Smell of refrigerant.**	**# CANNOT BE REPAIRED. #Test the unit as per recommended test procedure & complete the Test-Certificate. # While requesting replacement, give the following details: 1/State,2/Ditrict,3/PHC,4/ type(Model No.),5/machine Sl.No.,6/Date of installation,7/Date from which beyond repair.**

SUGGESTIONS

SEE THE 'INFORMATION SECTION' FOR MISCELLANEOUS INFORMATION

SUGGESTIONS

SUGGESTION #1

The reason for burning of condenser fan motor or jamming of bushings is mostly due to accumulation of dusts.

Minimum once a year the fan motor should be removed,services & bushings lubricated.bearings can be cleaned by using Kerosene/petrol.After cleaning,apply only 3-in-1 or any other machine oil-Do not use grease/Mobil. Using the spare fan,the fans can be removed one by one for servicing.

SUGGESTION #2

With the 'new' cold-room panel, both the units will work when mains power is available. The old T1(Fi)timer in generator panel to be replaced by the new timer(yellow, with potentiometers)provided. With this timer, there will be three tries to start the generator, with intervals. In case of power failures. Another modification to be done is to put the aux.contact (provided)to the two points of this contact. The 'new' cold-room panel has 12 terminals points(in place of 10 in the 'old' one).The

other end of the above cable is to be connected to the points 11 &12 of the 'new' panel.

SUGGESTION #3
One'new' panel, one two-core cable, one Aux.contact & one T1 timer(yellow,with two pot.on(ront)dispatched to all WIC/F locations in end 1986.

Please locate them & connect in place of 'old'panel,as detailed in suggestion #2 above**.**

SUGGESTION #4
Locally available replacement for NK/GK contactors:
Telemecanique & controls(Tc)
Model: LC1 D1733,A60 with 220 Volts coil
Auxiliary contacts (Add-on-blocks):
LA1-D22(2 NO 2 NC)

SUGGESTION #5
Defect in stop-solenoid alignment leads to major problem like burning of solenoid, wiring in the panel & interconnections & also other components.

Check alignment of stop-solenoid frequency and adjust if necessary. If plunger does not go in fully, it may take about 30 Amps or more current .In case the solenoid holds & does not release, release it by switching the AUT/MAN selector to '0'position.Sometimes,the plunger gets rusted & does not move freely. Remove the plunger, clean & apply a very thin coat of oil on it. Also check stop timing on T2(20 sec.).This time can be reduced to 12-15 sec.safely,if the generator stops within shorter time.

SUGGESTION #6
Observe the following difference in 'Huurre' &'Foster' units:

*'Huurre' cooling units have capillary tube in place of expansion valves(as in 'foster'0.
*There is one extra pressostat in 'Huurre'units to control condenser fan.
*'Foster' units have separate thermoststt,'Huurre'thermostat & thermometer are combined in a single unit.
*Thermostats in cooling units & alarm unit in 'Huurre'WIC are identical.

SUGGESTION #7
Accumulation of dust in the condenser fins & wire mesh at the bottom of the cooling units in all the 'Huurre' & 'Foster' units cannot be removed completely with general equipments.Air blower is required to be used.

SUGGESTION #8
The reason of fuse S1 blowing off in 'Foster'generator panel is mostly due to any of the 3 protections diodes shorted.they can be replaced by locally available diodes,viz: BY 127/BY126/IN4007/BY100 etc.

SUGGESTION #9
RH1 7 RH2 in 'Foster'generator panel & km1 & km2 of 'Huurre'control panel (new) for Diesel engine are similar. All can be interchanged.

SUGGESTION #10
The resistance of E1 charging circuit in 'Foster' generator panel falls out of its position mainly due to melting of the solder connection due to overheat. While refitting, tie the terminals in position with a piece of copper wire & then re-solder.

NOTE:No Load output voltage of E1=14.4 Volts ,DC

Check battery condition. If low, it will draw high current & over-heat/damage the components of E1.Also fuse S2(8 A)may blow off. Disconnect battery & boost charge externally & reconnect.

It is suggested to keep one extra battery as stand-by.

SUGGESTION #11
DM-188 engines can be started by pull ropes. Open the decompression lever,pull the rope & close the decompression lever at maximum speed.(Ranchi,Nasik experience).

NEVER OPERATE THE DE-COMPRESSION LEVER WHEN THE ENGINE IS RUNNING.

SUGGESTION #12
If the engine is not is use for longer time & tank is kept filled with fuel, sludge forms in the fuel tank & the carburetor.

For cleaning, drain the fuel tank & clean tank carburetor. If complete cleaning is not possible with petrol,cleaning with CTC or thinner may be tried.DO NOT USE CTC/THINNER ON PLASTIC/NYLON PARTS(e.g.Float).

SUGGESTION #13
In case the Electronic Leak detector is malfunctioning(sounds in air only, LED dims during sound):change the filter & cell.